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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/606,512 | 06/26/2003 | Jung-Wook Kim | 8054-23 (AW8037US/JJ) | 5217 |
| 22150 | 7590 | 02/21/2006 | EXAMINER | |
| F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797 | | | KORNAKOV, MICHAIL | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1746 | |

DATE MAILED: 02/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/606,512

Applicant(s)

KIM ET AL.

Examiner

Michael Kornakov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2003.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-19 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recited in claim 2 "...an inside of the processing chamber includes silicon oxide" and in claim 9 "...at least one of the stage and the belljar includes silicon oxide" constitutes an indefinite subject matter because it is not clear what the recited "silicon oxide" is attributed to. It is not clear whether an impurity of silicon oxide or a protective coating including silicon oxide is indicated. Clarification is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4, 7-9, 11, 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayasaka et al (U.S. 6,649,082) in view of Williams et al (U.S. 5,647,953).

Hayasaka teaches a method for manufacturing a semiconductor device comprising treating semiconductor substrate by forming and etching films, including SiO₂ film, with a plasma of gas including hydrogen and argon (col.5, lines 47-55). Hayasaka also teaches that the apparatus for forming semiconductor device is cleaned in order to remove unnecessary deposit accumulated on the inner wall of the apparatus, jig and the like, because unnecessary deposit accumulated causes generation of particles and must be removed on occasions so as to form a good film (col.13, lines 2-

7). Hayasaka remains silent about specificities of cleaning the inside surfaces of the apparatus.

Williams teaches cleaning a plasma processing chamber wherein oxide containing layers, including SiO_2 , have been previously formed and treated, thus leaving residues on inside surfaces of the chamber. The method of Williams includes cleaning the processing chamber with a plasma formed from non-hydrogenous gas(es), such as NF_3 , SF_6 , fluorocarbons, represented by CF_4 , C_2F_6 . The gaseous mixture of Williams also may include argon (Abstract; col. 3, lines 17-51; col.4, lines 15-23, 41-43).

Therefore, since Hayasaka is concerned with cleaning the semiconductor processing apparatus, wherein the oxide films, including SiO_2 , have been plasma processed and Williams teaches cleaning a plasma processing chamber wherein oxide containing layers, including SiO_2 , have been previously formed and treated, one skilled in the art motivated by Williams would have found obvious to exhaust the apparatus of Hayasaka upon processing and remove the semiconductor device from the apparatus of Hayasaka, as conventionally utilized in the art, and employ the chamber cleaning method of Williams in order to clean the semiconductor processing apparatus of Hayasaka and, thus, to arrive at the claimed subject matter.

With regard to claims 8, which is concerned with disposing a belljar, it is noted here that the claimed invention calls for the process claims, wherein the steps of the process are met by the applied prior art, and the structural limitations of apparatus do not present manipulative difference between the claimed process steps and the prior art process. Therefore, the recitation of specific structural limitations of apparatus for

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performing such steps does not serve to limit the claim. See, e.g., In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963)

With regard to claim 9, which is concerned with a processing stage including silicon oxide, Hayasaka indicates that residues may accumulate on inside surfaces of the processing apparatus during semiconductor device processing. Since Hayasaka indicates treatment SiO₂ containing device, the residues of SiO₂ are expected to accumulate on the inside surfaces of processing apparatus.

With regard to the limitations of claims 13 and 14, which are specifically concerned with exhausting the second gas or the first gas, Hayasaka teaches importance of such exhausting and collecting the harmful gases formed during the semiconductor and/or chamber treatment procedures.

7. Claims 5, 6, 10, 12, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayasaka et al (U.S. 6,649,082) in view of Williams et al (U.S. 5,647,953) and in further view of Zhao et al (U.S. 5,660,682) or Nemoto et al (6,992,011), each one individually.

The teaching of Hayasaka/Williams does not specifically indicate a flow ratio between argon and hydrogen and a temperature for removing impurities, particularly silicon oxide, from the semiconductor device. However, such parameters are result effective, because they affect the rate of processing and surface condition of the substrate. Providing optimum processing parameters is within the skills of ordinary skilled in the art and would be obvious, consult In re Boesch and Slaney 205 USPQ 215 (CCPA 1980).

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Besides, the recited processing parameters are conventionally utilized in the art, as specified, for example by Zhao (col.3, lines 32-50) or Nemoto (paragraph, bridging col.7 and 8), both teaching the use of hydrogen/argon plasma for the removing of silicon oxide from wafer/IC surfaces. Therefore, one skilled in the art would have found obvious to utilize processing parameters of Zhao or Nemoto, while treating semiconductor device as per teaching of Hayasaka/Williams with the reasonable expectation of success.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "M. Kornakov", with a long, sweeping horizontal stroke extending to the right.

Michael Kornakov

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Primary Examiner
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02/16/2006